

GEMINI LANDING AND RECOVERY SYSTEMS *

R. Rose
MSC

X65 84338

Mr. Rose indicated that the Gemini project has the following requirements for a landing system:

- a) zero vertical velocity
- b) controlled descent with up-wind capability
- c) acceleration and forces at touch down in a known direction
- d) minimum volume and light weight
- e) water or land recovery capability
- f) landing device (paraglider with parachute back-up) must not hold up Gemini schedule

Under the restraints noted above, the Gemini project office has concluded that the paraglider is the most feasible device for recovery.

Operation characteristics of the inflatable paraglider are as follows:

deployment at 55,000 ft with a $q = 40$ lbs/sq ft

a glide angle of -17.5° with a forward velocity of 68 fps and a sink rate of 21 fps

a pre-flare angle of attack of -1.5° with a forward velocity of 68 fps and a sink rate of 21 fps. Altitude for this maneuver is 390 feet.

At a flare altitude of 45 feet, the angle of attack is 8° with an increased forward velocity and sink rate of 96 fps and 35 fps respectively. Touch-down forward velocity is 68 fps with a vertical velocity ranging from 0 - 5 fps. Design studies indicate the 510-lb paraglider has a down-range capability of 21 NM and an up-range capability of 16 NM from 40,000 feet altitude in still air.

* Based on notes taken during presentation of paper.